IEEE-STD-1658 DAC STANDARDS WORKING COMMITTEE

Norwood, MA

03 June 2009, 09:00 – 17:00

Attendees:

Steve Tilden, Chair and Host (by Webex)
Sol Max, LTX-Credence Corporation, Secretary
Fan Xu, Polytope Solutions
Jerry Blair, Retired, Draft Editor (by Webex)
Tom Linnenbrink, Hittite, TC-10 Chair

AGENDA

09:00 – 09:15 Opening remarks	-	Tilden
09:15 – 09:30 Review & approval of minutes from last meeting	-	Max
09:30 – 09:45 Discussion of PAR timetable & plans	-	Tilden
09:45 – 10:00 Assignments review	-	All
10:00 - 10:30 Draft review and meeting agenda review	-	Daponte
10:30 – 10:45 Break	-	All
10:45 – 12:00 Discussion of status of the draft standard	-	All
12:00 - 13:00 Break For Lunch	-	All
13:00 – 15:00 Continuation of draft review	-	All
15:00 – 15:15 Break	-	All
15:15 – 16:30 Continuation of draft review, make assignments	-	All
16:30 - 17:00 Assignment review	-	Max
17:00 Adjourn meeting	-	Tilden

Fang Xu noted that committee members in Europe should be able to attend Webex meetings by using the Skye program to convert laptops into telephones. See http://www.skye.com/

Steve Tilden noted that the draft must be submitted for approval in about a year and a half.

The meeting reviewed some of the assignments from the previous meeting that are listed below.

Assignments;

Task #	Clause	Editor	Reviewer	Description
1	11.2	Steve Tilden	Jerry Blair	SNR
2	11.3	Sol Max	Tom Linnenbrink	Effective Number of Bits
3	12.0-12.4	Haasz	Tom	Intermodulation Distortion, Glitches, 1/f noise
4	Annex A	Pasquale	Richard	DAC Architectures
5	4.1.1?	Jerry	Sol	Test Setup review
6	Figure 2	Sol	Jerry	Clarify DAC/ADC Differences
7	Table 1	Pasquale		Edit to not allow page break in table
8	9.3	Jerry	Pasquale	Dynamic Gain and Offset
9	3.2	Pasquale		Review Symbols & Acronyms
10	4.3	Jerry	Michaeli	Address comments on static testing
11	4.2	Sol	Jerry	Rewrite notch etc
12	4.4	Sol	Jerry	Dynamic Testing
13	4.5	Steve		Review
14	Figure 4	Sol	Jerry	Add Caption
15	5.1	Niclas		References will be reviewed
16	13	Jerry	Sol	Step response review
17	5	Jerry	Sol	Reword for DAC instead of ADC
18	14.1-14.2	Niclas		Channel Matching
19	15	Bergman	Sol	Frequency Response
20	17	Sol	Pasquale	Power Supply Parameters
21	18	Fang	Niclas	Data Dependent Parameters

Steve Tilden submitted comments concerning the SNR section (Assignment #1)

The ENOB section will be further reviewed by Jerry Blair (Assignment #2)

The Step response review (Assignment #16) has had much discussion. Sol Max will attempt to incorporate all the previous inputs into a new draft of that section.

Figure IV was modified by Solomon Max (assignment # 14), but was not available for review at the meeting the modified Figure IV is shown below;

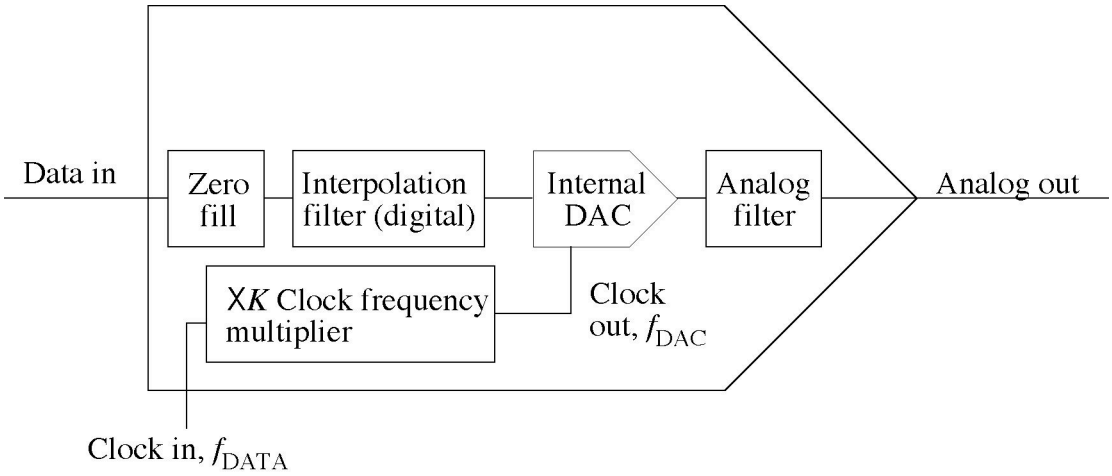

Figure IV – Block Diagram of DAC and Interpolator that is used to Describe DAC Dynamic Response. If K = 1, the DAC Operates as a Classic DAC

The figure defines the DAC analysis of bandwidth. If K=1 then the DAC is a classic DAC where the internal DAC inputs are identical to Data in.

Assignments 11 and 12 were completed. The reviewed changes were incorporated into the draft that is currently on the web site (03 June 2009).

It was recommended that text should be added at the beginning of Annex A to identify the purpose of the annex (DAC Architectures) and to describe each of the figures. The figures require modification to make them have a more standardized appearance.

The definitions of update rate and clock rate used in section 6 should be the same as those used in Figure IV.

There are three alternate approaches to measuring THD in a DAC.

1. If the DAC generates a tone at frequency F, measure the components at frequencies 2F, 3F, …, 9F, 10F.
2. Measure the components at the frequencies described above up to the Nyquist frequency and then measure the components that are the folded harmonics, if mF exceeds the Nyquist frequency.
3. Measure the components at both the folded harmonic frequencies and the harmonic frequencies.

The committee should decide the appropriate option. I would recommend option 3.

The following are the assignments for the next meeting in October.

Task #	Clause	Editor	Reviewer	Description
1	All	Pasquale		Remove all hard-wired section numbers, equations, and figure numbers
2	11.3		Jerry	ENOB
3	12.0-12.4	Haasz	Tom	Intermodulation Distortion, Glitches, 1/f noise
4	Annex A	Pasquale	Richard	DAC Architectures
5	4.1.1?	Jerry	Sol	Test Setup review
6	Table 1	Pasquale		Edit to not allow page break in table
7	9.3	Jerry	Pasquale	Dynamic Gain and Offset
8	3.2	Pasquale		Review Symbols & Acronyms
9	4.3	Jerry	Michaeli	Address comments on static testing
10	6	Sol	Jerry	Consistent symbols for data rate and update rate
11	3.1.84 3.1.85 12.1	Sol	Steve	Make the text and equations reflect the folded harmonics
12	5.1	Niclas		References will be reviewed
13	13	Sol	Jerry	Step response review
14	5	Jerry	Sol	Reword for DAC instead of ADC
15	14.1-14.2	Niclas		Channel Matching
16	18	Fang	Niclas	Data Dependent Parameters